

LISTING OF THE CLAIMS

1. (Withdrawn) A sequential lateral solidification apparatus, comprising:
a laser generator generating and emitting a laser beam;
an X-Y stage movable in two orthogonal axial directions;
a mask arranged between the laser generator and the X-Y stage, the mask having a plurality of slits through which the laser beam passes;
an objective lens arranged between the mask and the X-Y stage, the objective lens for scaling down the laser beam; and
a mask stage connected to the mask, the mask stage controlling minute movement of the mask.
2. (Withdrawn) The apparatus according to claim 1, further comprising a condenser lens between the mask and the laser generator.
3. (Withdrawn) The apparatus according to claim 2, wherein the condenser lens condenses the laser beam.
4. (Withdrawn) The apparatus according to claim 1, wherein a distance over which the X-Y stage is movable is greater than a distance over which the mask controlled by the mask stage is movable.
5. (Previously Presented) A method of crystallizing an amorphous silicon film using a sequential lateral solidification apparatus, which includes a laser generator generating and emitting a laser beam, an X-Y stage movable in two orthogonal axial directions, a mask arranged between the laser generator and the X-Y stage, the mask having a plurality of slits through which the laser beam passes, an objective lens arranged between the mask and the X-Y stage and the objective lens scaling down the laser beam, and a mask stage connected to the mask, the mask stage controlling fine movement of the mask, the method comprising:
setting a substrate having an amorphous silicon film thereon upon the X-Y stage;
applying the laser beam to the amorphous silicon film after the laser beam passes through the plurality of slits of the mask, wherein the mask defines a block in the amorphous silicon film;

melting first portions of the block, wherein each first portion of the block corresponds to each slit of the mask;

crystallizing the first portions of the block by sequential lateral solidification that grows grains along a first direction from interfaces between solid phase amorphous silicon and liquid phase silicon;

stepping the mask in the first direction by several micrometers within the block using the mask stage;

repeatedly melting and crystallizing next portions of the block adjacent to the first portions within the block whenever the mask steps in the first direction by the mask stage until a lateral grain growth stops in the block by a collision of laterally grown grains, thereby completing the crystallization within the block in the amorphous silicon film;

stepping the X-Y stage block by block in the first direction to crystallize another block of the amorphous silicon film after completing the crystallization in the previous block;

repeatedly melting and crystallizing another block of the amorphous silicon film whenever the X-Y stage steps; and

stepping the X-Y stage in a second direction perpendicular to the first direction after completing the crystallization of all blocks disposed long the first direction and then stepping the X-Y stage in the first direction to further crystallize additional blocks along the first direction.

6. (Previously Presented) The method according to claim 5, wherein the laser beam irradiates the amorphous silicon film whenever the mask steps by the mask stage.

7. (Previously Presented) The method according to claim 5, wherein the mask stage steps the mask in a direction of lateral grain growth by a distance which is equal to or less than the length of the lateral grain growth.

8. (Previously Presented) The method according to claim 5, wherein the sequential lateral solidification apparatus includes a condenser lens between the mask and the laser generator.

9. (Original) The method according to claim 8, wherein the condenser lens condenses the laser beam.

10. (Previously Presented) The method according to claim 5, wherein a distance over which the X-Y stage steps is greater than a distance over which the mask controlled by the mask stage steps.

11. (Previously Presented) A method of crystallizing an amorphous silicon film using a sequential lateral solidification apparatus, comprising:

providing a substrate having an amorphous silicon film thereon on an X-Y stage;

applying a laser beam to the amorphous silicon film through a mask having plurality of slits so that first portions of the amorphous silicon film corresponding to each slit of the mask are melted, wherein the mask defines a block in the amorphous silicon film;

crystallizing the first portions of the amorphous silicon film by the sequential lateral solidification that grows grains along a first direction from interfaces between solid phase amorphous silicon and liquid phase silicon;

stepping the mask in the first direction by several micrometers within the block so that the plurality of slits correspond to next portions of the block that have not been crystallized;

repeatedly melting and crystallizing the next portions of the amorphous silicon film within the block and stepping the mask until a lateral grain growth stops in the block by a collision of laterally grown grains, thereby completing the crystallization within the block in the amorphous silicon film;

stepping the substrate block by block in the first direction to correspond to a next block of the amorphous silicon film after completing the crystallization in the previous block, the next block having a portion with uncrystallized silicon film;

repeatedly melting and crystallizing portions of the next block of the amorphous silicon film by stepping the mask until a lateral grain growth in the next block stops by a collision of laterally grown grains; and

stepping the X-Y stage in a second direction perpendicular to the first direction after completing the crystallization of all blocks disposed long the first direction and then stepping the X-Y stage in the first direction to further crystallize additional blocks along the first direction.

12. (Previously Presented) The method according to claim 11, wherein the laser beam is applied to the amorphous silicon film after each time the mask is stepped.

13. (Previously Presented) The method according to claim 11, wherein the mask is stepped in a direction of lateral grain growth by a distance which is equal to or less than the length of the lateral growth.

14. (Previously Presented) The method according to claim 11, wherein a distance by which the substrate is stepped is greater than a distance by which the mask is stepped.